Crystallization of Supersaturated Sodium Acetate Solution

Instant “hot ice”

Chemicals and Equipment Needed – For Prepared Flask

- Flask of Supersaturated Sodium Acetate – **C**
  - 3-4 labeled dedicated flasks
  - See next page for instructions for making a new flask
- Sodium Acetate trihydrate, $NaC_2H_3O_2 \cdot 3\ H_2O$ – **C, more in F5**
- Microspatula – **U1**

Preparation

- Hand carry the flask to the classroom to minimize accidental crystallization

Presentation

- Add a few crystals of $NaC_2H_3O_2$ to the flask and observe the rapid exothermic crystallization of the supersaturated solution
- Alternatively, you can place a few crystals in a baking dish and pour the solution on top, rapidly forming a sodium acetate stalagmite.

Clean-Up

- **WARNING** – Do not leave the solution on the hotplate overnight. It will explode and/or burn.
- Heat the flask, with petri dish lid, on the “good” hotplate @ 300°C until the solution dissolves again. Leave on hotplate to cool before transferring it back to the bench.
  - The good hotplate is the one with the metal top, and it heats the solution is very fast
- If the crystallized solution has already cooled, e.g. it crystallized overnight, it may take an a while to re-dissolve the solution

Making a New Flask

- Before making a new flask, add d-H_2O to the line marked on the side of the flask, reheat, crystalize, and reheat again. Sometimes this works the "kinks" out of the old flask.
- This procedure should only need to be used occasionally. The prepared flasks of sodium acetate will last for years. Make a new one if a flask has become seriously unstable, and is consistently crystallizing spontaneously, or if some contaminant has gotten into the flask (ie dirt or lint). Dispose of the previous solution down the drain with plenty of water, and wash the flask well.

Chemicals and Equipment Needed

- d-H_2O
- ~1200 g $NaC_2H_3O_2 \cdot 3\ H_2O$ – **F5**
  - We usually don't have this much on hand, so check with Chem Recycling, or order some.
- 2 L dedicated Erlenmeyer flask – from previous solution
- Hotplate – **A4**

Preparation

- Pour the $NaC_2H_3O_2 \cdot 3\ H_2O$ into the flask. Add 200 mL d-H_2O (since the crystal is a trihydrate, you don't need much water)
- Heat slowly on the hotplate until the $NaC_2H_3O_2 \cdot 3\ H_2O$ dissolves. Then swirl the flask by hand, rinse the sides with a wash bottle, and swirl again. Fill the flask with water to the line marked on the side.
- Allow the solution to cool and test with a crystal of $NaC_2H_3O_2 \cdot 3\ H_2O$. You're looking for a rapid (15-30s) spreading crystallization. You may have to add a little more water and heat again.